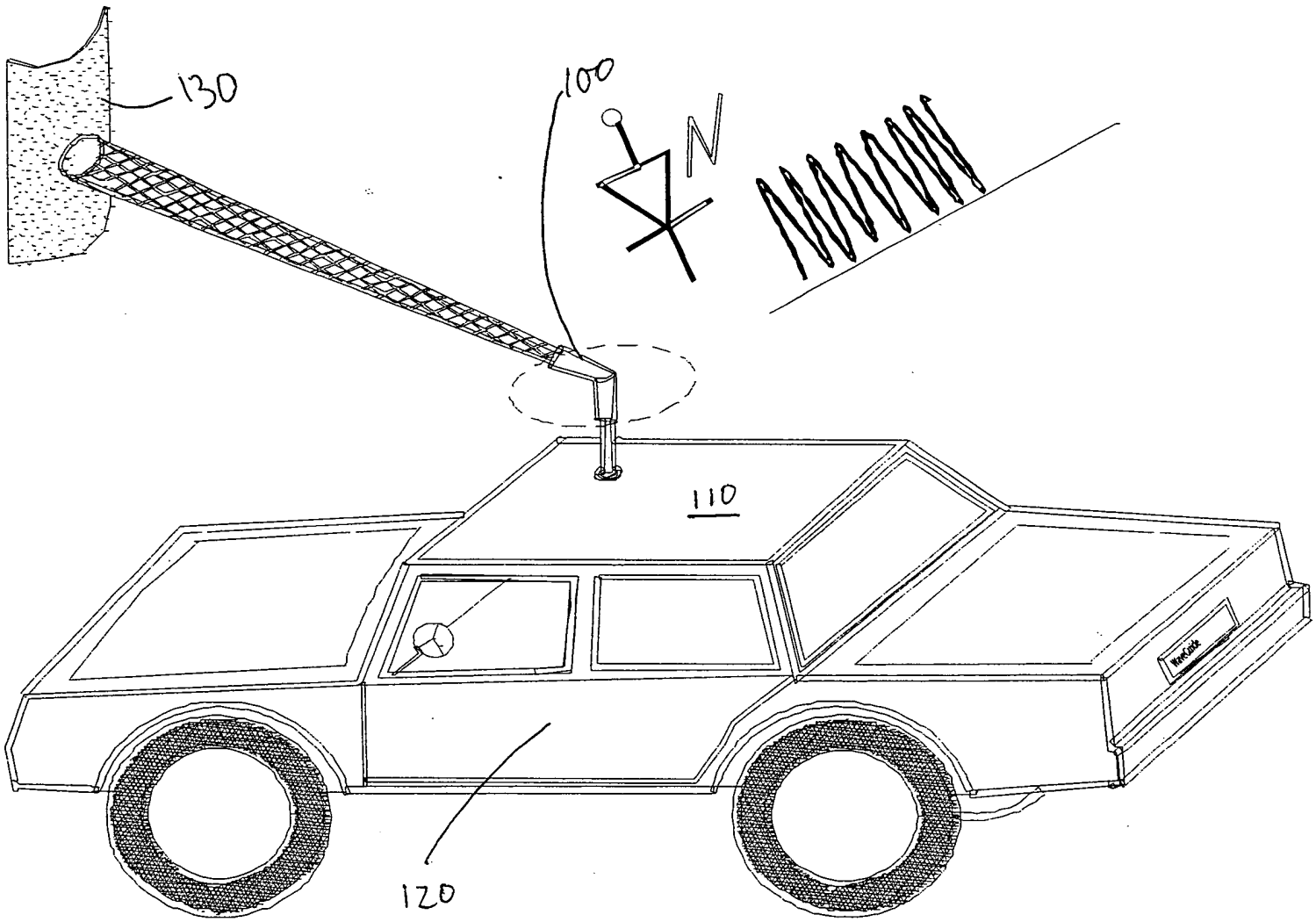


FIG. 1

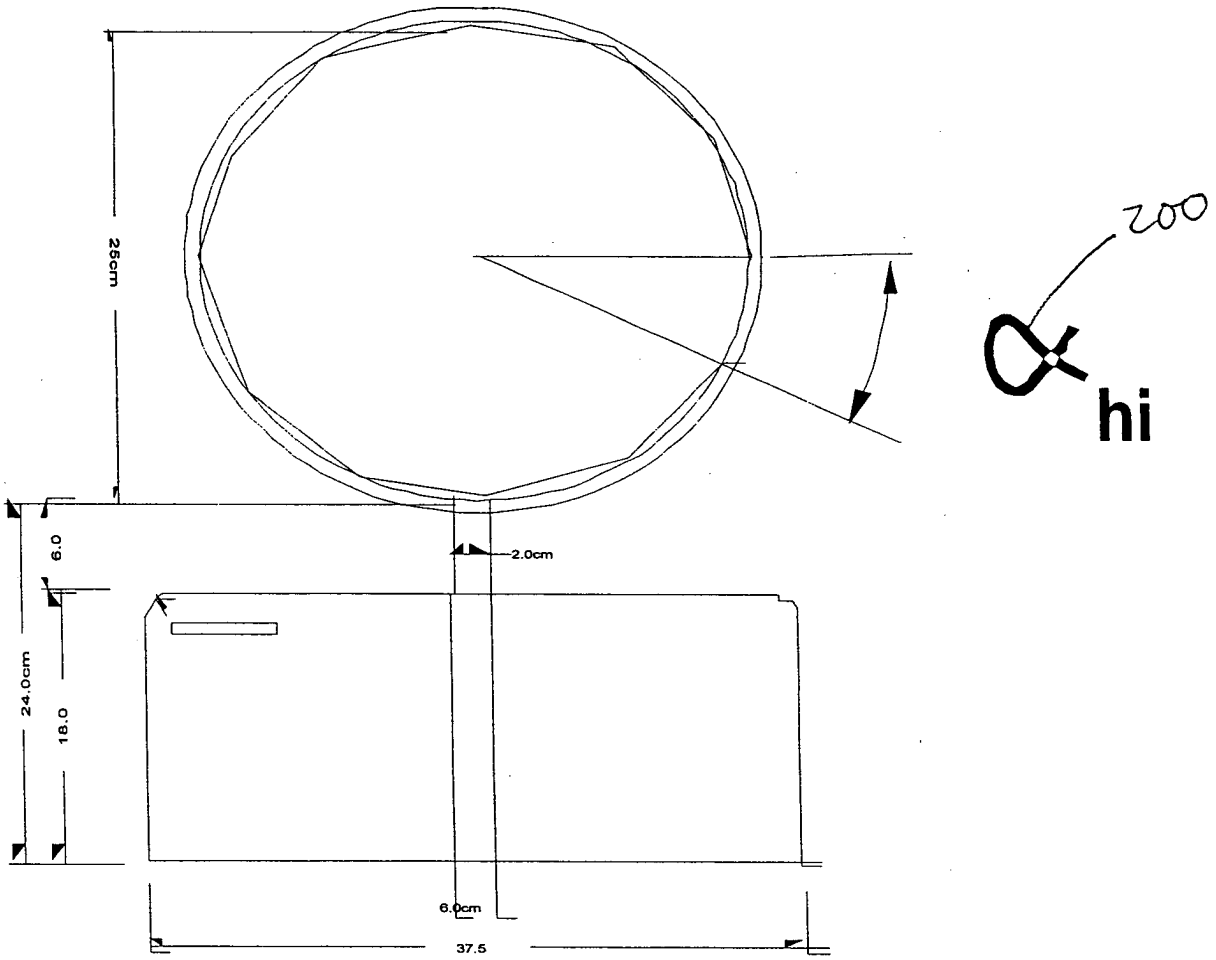
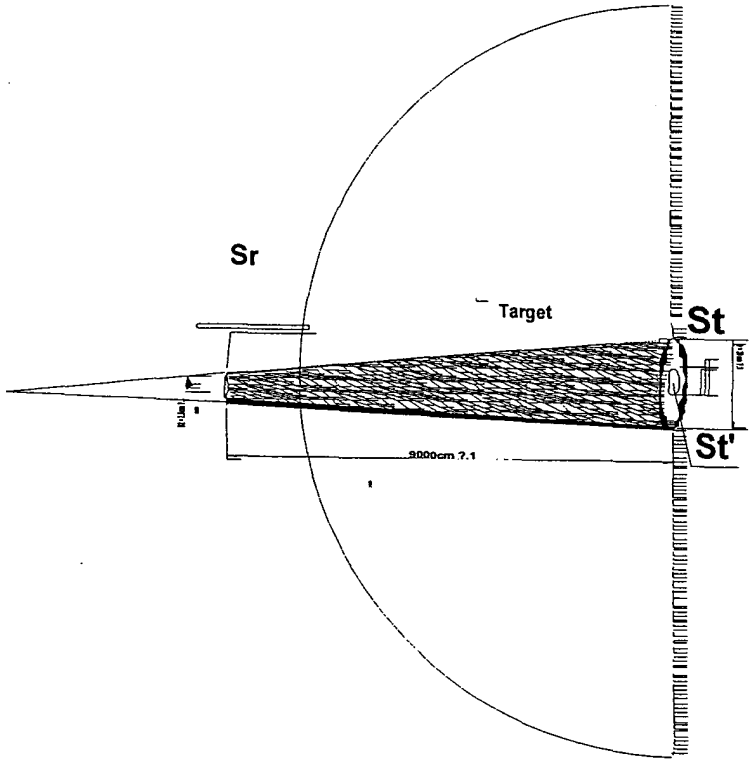


Fig. 2



Efficiency = 25%* (St'/St) (Sl'/Sr)=

- Assuming all reflected energy is spreading over a half-sphere
- Assuming target absorbs 75% of the insertion energy
- Assumeing laser target be a 20 diameter ball

St: Targer area as beam capacity, with Dt = 120cm.

St': Ttarget area when striking over a real obstacle, with Dt' = 27.65cm.

Sl: optical len area, with Dl = 2.5cm.

Sr: area that reflected wave cover, assuming to be half sphere

with D = 180 Meters.

St = Pi Rt**2 = Pi (0.60**2) = 1.13 (Squre Meter)

FIG 2A

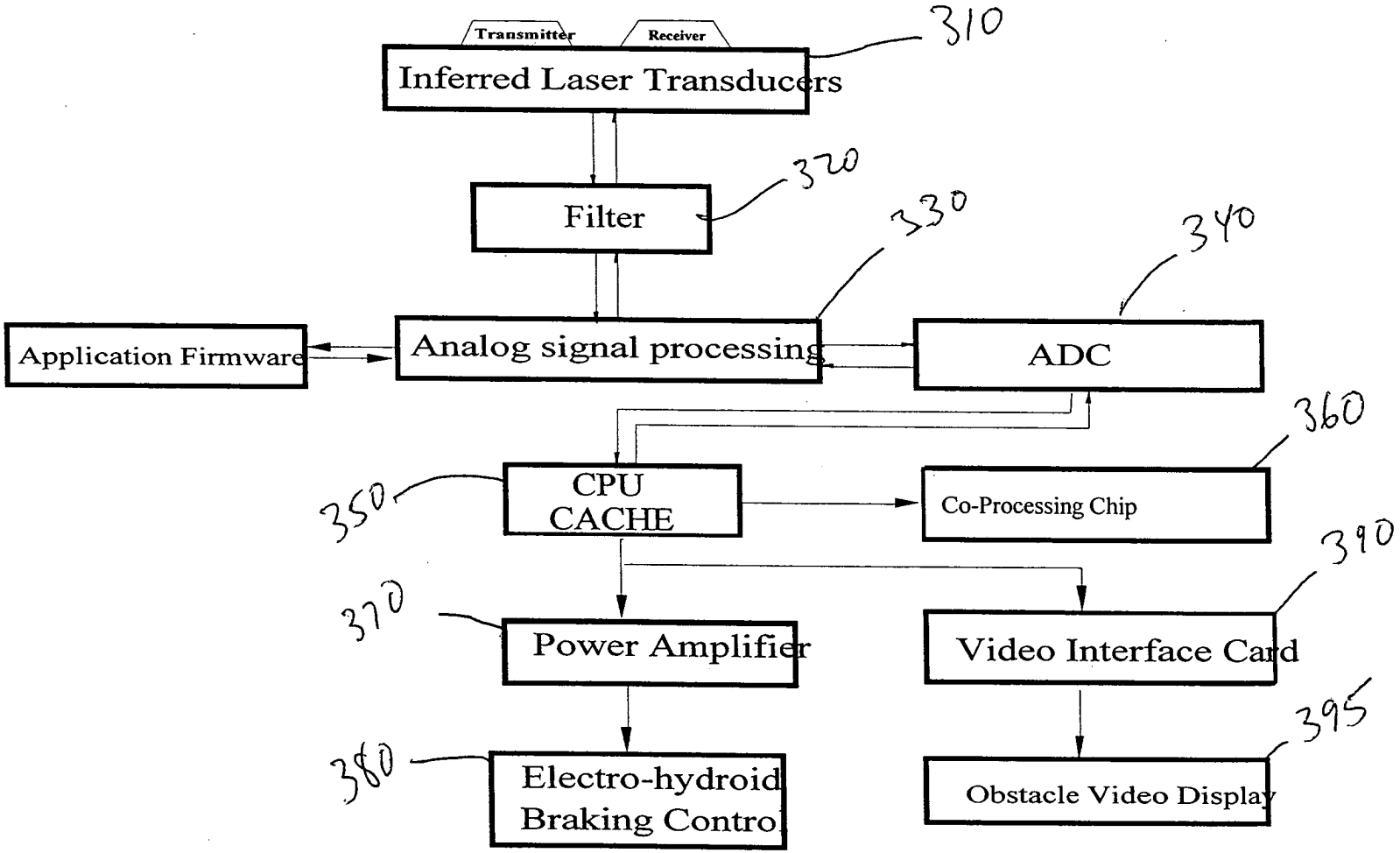

Transmitter
Receiver
Inferred Laser Transducers
310
Filter
320
330
340
Application Firmware
Analog signal processing
ADC
360
350
CPU
CACHE
Co-Processing Chip
390
370
Power Amplifier
Video Interface Card
395
380
Electro-hydroid
Braking Contro
Obstacle Video Display

FIG 3

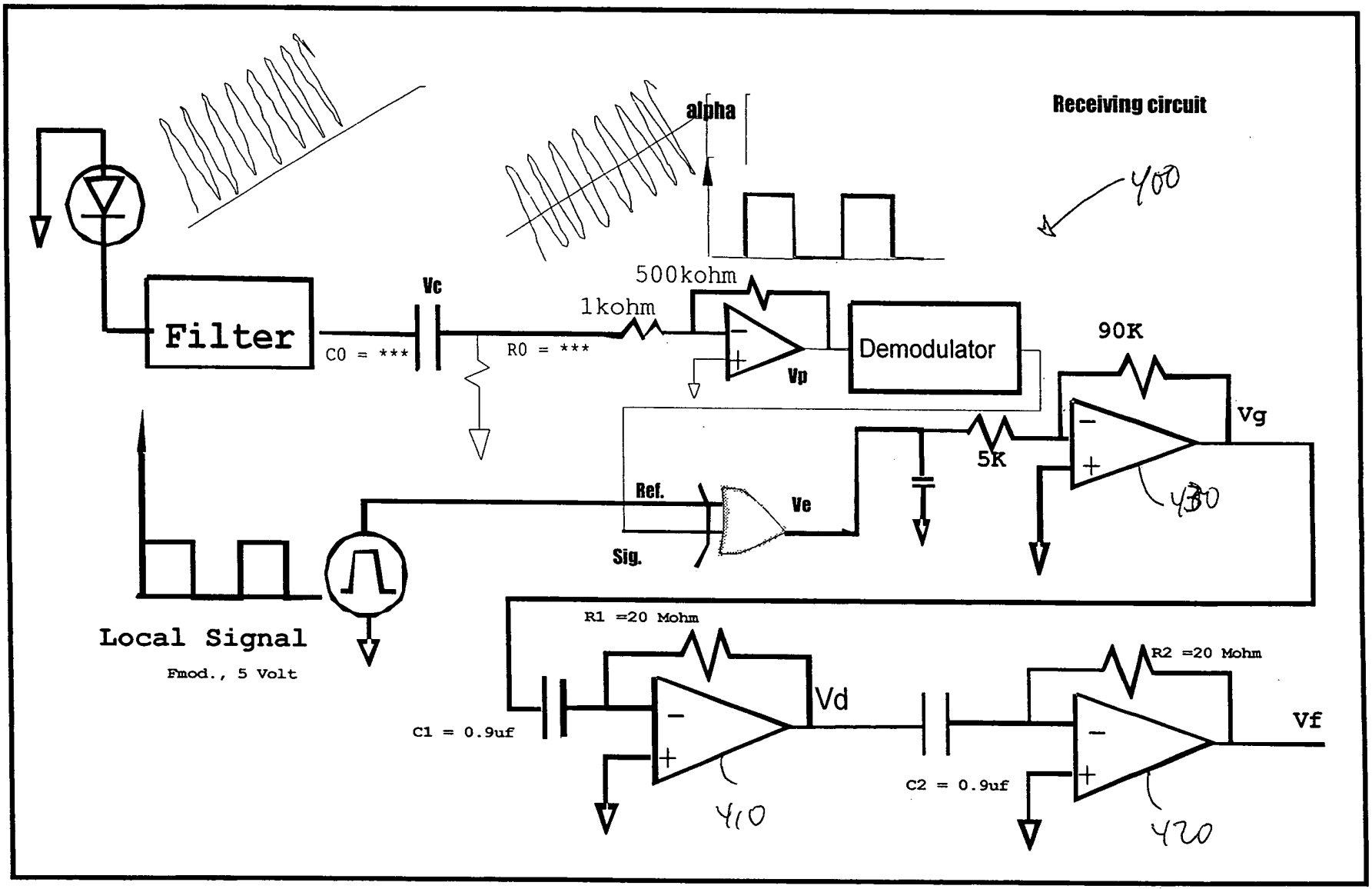

Receiving circuit
400
alpha
Filter
Vc
C0 = ***
R0 = ***
1kohm
500kohm
Vp
Demodulator
90K
Vg
5K
430
Ref.
Sig.
Ve
Local Signal
Fmod., 5 Volt
R1 =20 Mohm
C1 = 0.9uf
Vd
410
C2 = 0.9uf
R2 =20 Mohm
Vf
420

Fig. 4

(1) When Vf '= (Vd /dt)/dt < 20m/s**3, timer starts and t1 is recorded. ← 510

(2) Record Vr and a at this time: ← 520

Vr = dR/dt = 18 dVe/dt = Vd

(3) When Vf = 0 again, timer stops and t2 recorded.. ← 530

(4) Find Ts ← 540

Ts = t2 - t1

(5) Determine Q ← 550

Q =T s - α/ω Scanner

(6) Find Tc (Time to Collision occuring) ← 555

Tc = R / Vr

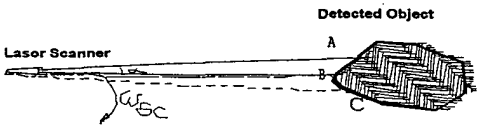
(7) Quoteria factors for Collision Judgement ← 560

(a) Set L = 1 if Q = 0 and L = 0 if Q = 0
M = 1 if Tc < 0; and M = 0 if Tc > 0
Set N = 1 if ABS of R/Vr < 2, and N = 0 if ABS of R/Vr > 1.5

(b) **K = L * M * N**

(8) K = 1, Collision will occur and immediate braking required; ← 570

K = 0; No collision will occur shortly, no braking control action required.



Notes 1: When laser scanning beam (the front of the wave bandle) sweeps from AB to BC, which represents the relative speed at this case.

Note 2:Mechanical control is based on judgement on above logic sequence.

Note 3: With scanner continuously sweeping, all parts of any obstacle will detected and treated.

Note 4: This is the fundamental model algorithm, for detail and practical , please refer to table 6: Signal Process and Operation Time

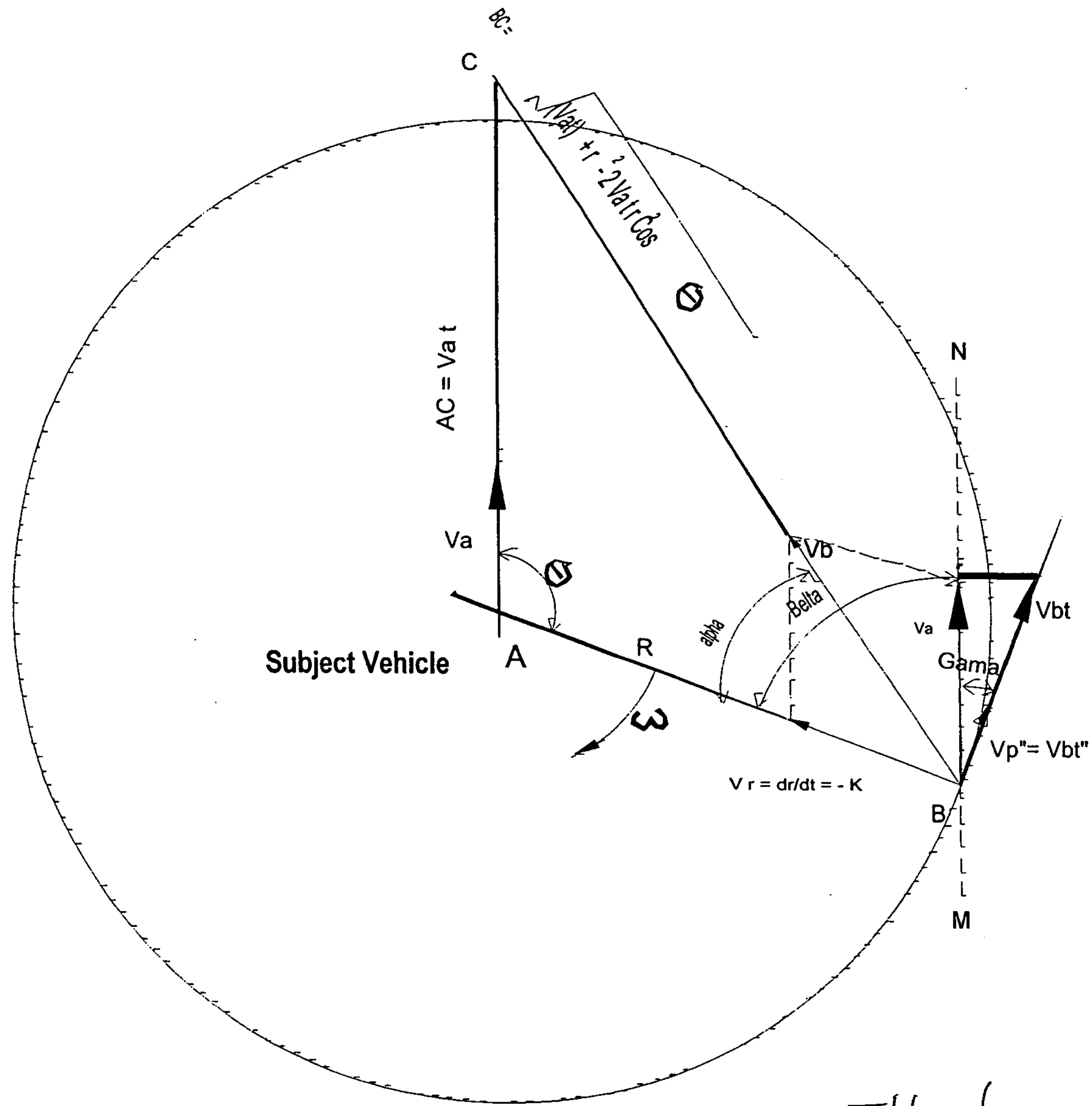

BC=
C
AC = Va t
Va
A
R
Subject Vehicle
3
alpha
Belta
Vb
N
Va
Vbt
Gama
Vp"= Vbt"
V r = dr/dt = - K
B
M

FIG. 6

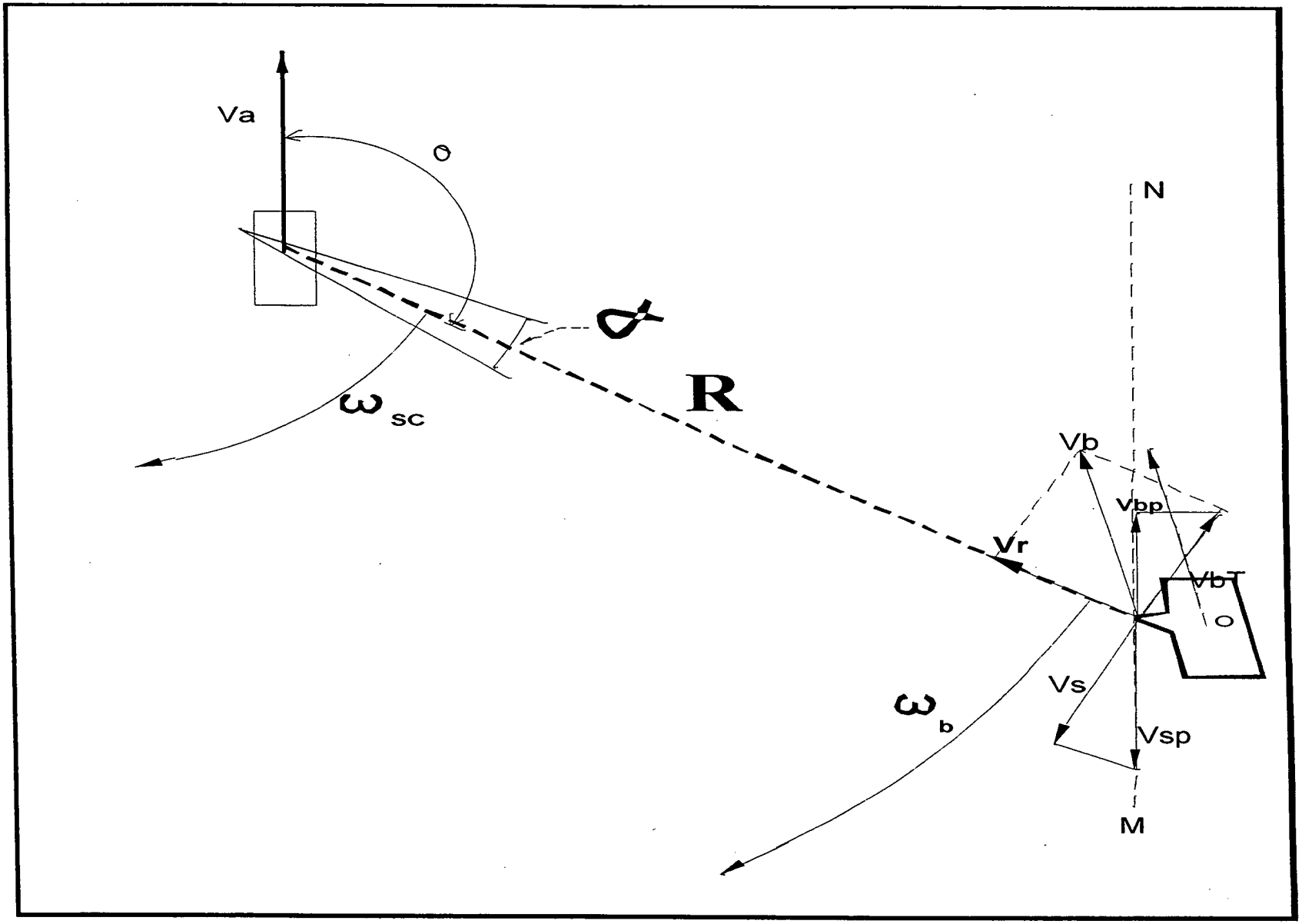


FIG 7

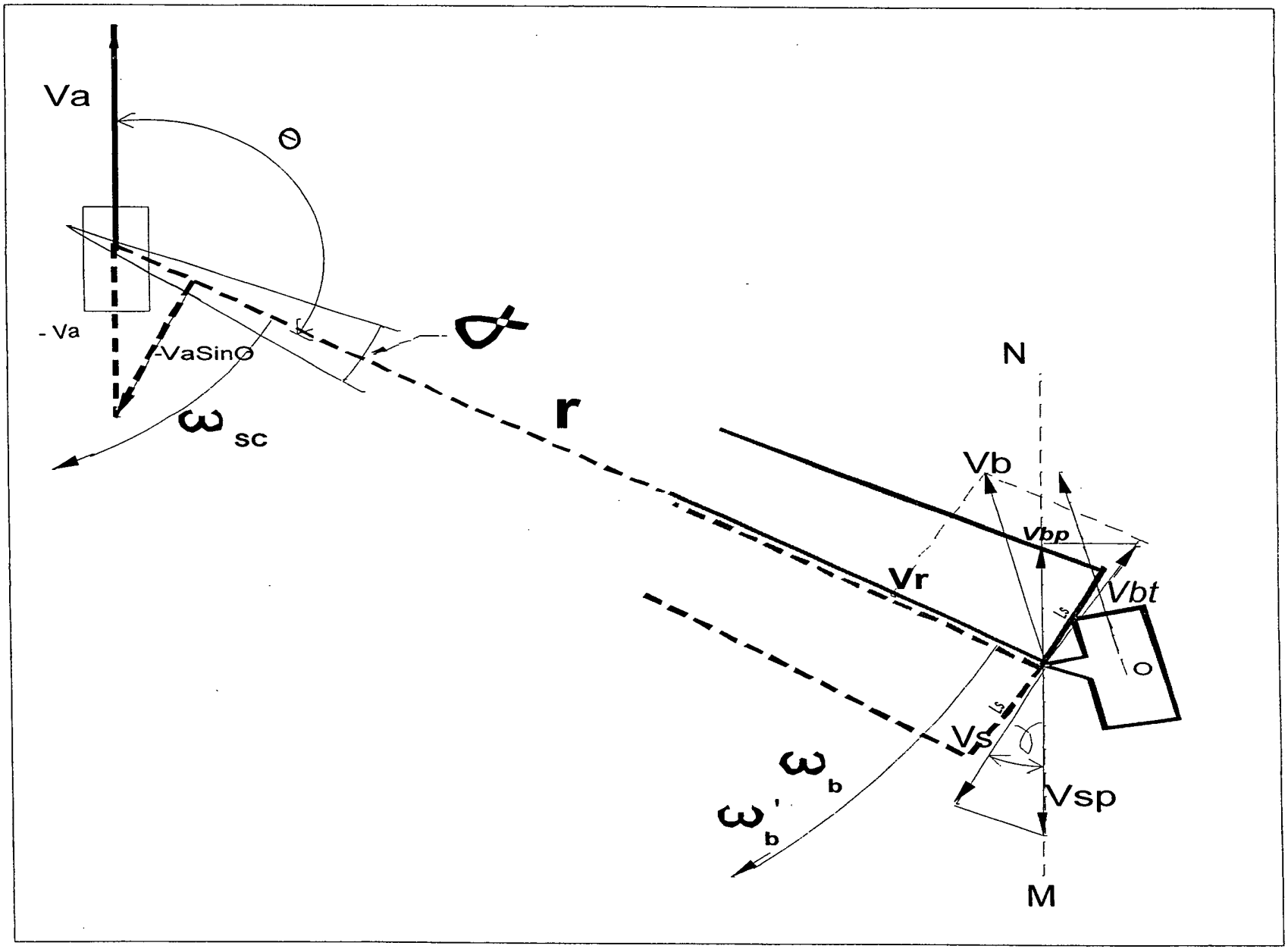


FIG 8